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Installation, use and maintenance manual

Heaters Line F2 Series C

Gas fired unit heaters

for heating medium-large areas

Natural gas/LPG fired

EDITION: 06/2011
Code: D-LBR552

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FOREWORD

This manual is intended for those people who need to install and use the Robur F2 C Series Gas Fired Unit Heaters.

In particular this manual is addressed to the hydraulic installation technician who shall install the generator, the electrical installation technician who shall connect the generator to the power supply and the final user who shall check its normal working.

This manual is also addressed to the Technical Assistance Centres for the main service operations.

Meaning of Icons

The icons placed on the right margin of the odd pages of this manual have the following meaning:

	Danger signal
	Warning
	Note
	Start of operating procedure
	Reference to another part of the manual or to another manual/book

Table 1 – Descriptive Icons

	Section 1 - Generality and Technical Characteristics
	Section 2 - User
	Section 3 - Hydraulic Installation Technician
	Section 4 - Electrical Installation Technician
	Section 5 - Maintenance and Servicing

Table 2 – Section Icons

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SEZIONE 1: GENERAL INFORMATION AND TECHNICAL CHARACTERISTICS

In this section you can find the general warnings to follow for the installation and use of the F2 C Series heaters, a short description of the heater operation, design characteristics and technical data.

1.1 GENERAL WARNINGS

This manual is an integral and essential part of the product and must be given to the final user.
This appliance must be exclusively used for the purpose it was intended. Any other use is to be considered improper and therefore dangerous.
The Manufacturer will not be held responsible for damages resulting from installation errors or failure to comply with the Manufacturer's instructions.
The appliance must be installed in compliance with the rules and regulations in force.
Do not obstruct the fan intake opening or the air delivery grids.

☞ In case of failure and/or malfunction of the appliance, isolate the unit (disconnect it from the power supply and close the main gas cock), do not attempt any repair or direct servicing.
The Manufacturer's **Authorised Service Centres** using only original spare parts must only carry out any repair to the products.

The non-observance of the above-mentioned provisions may compromise the safety of the unit.
To ensure unit efficiency and correct operation, it is essential that **qualified service engineers** carry out annual maintenance following the Manufacturer's instructions.

By the term *Qualified Service Engineers* it is meant the personnel having specific technical skills in the field of heating system components for civil use. In any case for more information please contact the Technical Assistance Office of ROBUR S.p.A. (tel. +39 035/888111).

Should the unit be sold or transferred to another owner, please ensure that the manual remains with the unit for use by the new owner and/or installer.

Before turning the heater on, a **qualified service engineer** must check:

- that electric and gas supply ratings are the same as those given in the data plate.
- that the exhaust duct operates correctly.
- that combustion air feed and exhaust occur correctly according to the existing standards.
- the internal and external tightness of the fuel supply system.
- fuel flow control according to the heater power requirements.
- that the heater is supplied with the type of fuel for which it is pre-set.

- that the gas supply pressure is within rating limits.
- that the gas supply system is suitable to the heater and all safety and check-over devices prescribed by existing standards are duly installed.

Do not use gas pipes to ground the appliance, or any other electrical appliances.
Avoid unnecessary supply when unit is not in use and always clock the main gas cock.

If the appliance is turned off for a longer time period, close the main gas supply cock and cut off the power supply.

IF YOU SMELL GAS

- Do not operate electric switches, telephones and any other object or device which may cause sparks.
- Shut-off the gas supply.
- Open immediately doors and windows to create a cross-current of air to purify the room.
- Call for a **qualified service engineer**.

1.2 OPERATION OF THE UNIT

The F2 C Series gas fired unit heater is an independent heater appliance with airtight combustion circuit and forced air draft.
It is designed for an indoor installation - inside the area to be heated.
It is adjustable for the use of Natural Gas (G20) and L.P.G. (G30/G31) (appliance belonging to the $II_{2H3B/P}$ category according to the Standard EN 1020).
The combustion circuit is airtight regarding heated room and conforms the standard EN 1020 for the C type appliances: the air inlet of the combustion air and the flue exhaust are outdoors and are ensured through the operation of combustion blower.
The heater operation is controlled by a room thermostat on demand (available as accessory). When the thermostat is turned on the flame control box, after the pre-purge period (about 40 seconds), ignites the burner.
The flame sensor controls the ignition of the burner. If the flame does not appear the flame control unit locks out the heater.
The combustion products pass through the heat exchangers, the air flow given by the centrifugal fan provides warm air to the room.
The fan control thermostat allows the axial-flow fan to start automatically only when the heat exchangers are hot (after about 60 sec. from the flame detection or when the temperature of 60°C is reached on the exchanger thermostat) and to turn off when they are cold. This prevents cool air from being blown into the room.
If heat exchangers overheat due to malfunction, the temperature limit thermostat cuts off the supply to the gas valve by setting the blower and the fan; should the temperature increase further, the limit thermostat comes into operation causing the switching off of the heater. The limit thermostat reset is manual.

☞ After removing the cause of overheating, **Qualified service engineers** should carry out resetting of the temperature.

Ahead of the burner the flue fan is installed which makes the air-gas mixture and forces draft of the exhaust flues.

Ahead of the burner the flue fan is installed which makes the air-gas mixture and forces draft of the exhaust flues.
In case of obstructions in the exhaust or intake duct or in case of blower malfunction, the flame control box reduces automatically the combustion air and consequently the gas flow rate. In case of obstructions or malfunction beyond the allowed limits, the differential pressure switch closes the gas valve and consequently stops the fuel flow to the burner.
In the summer time it is possible to activate only the axial fan to provide pleasant and refreshing air movement in the room (for more information see Paragraph “SUMMER OPERATION (COOLING)” at page 15).

1.3 TECHNICAL CHARACTERISTICS

The F2 C Series gas fired unit heaters are supplied with:

- **Premix burner made of stainless steel**
- **High head blower**
- **Control board, with microprocessor and anti-noise filter**, which manages the following functions: burner ignition, flame monitor, blower speed control, fan/s control, exchanger temperature control by thermostat
- Cylindrical **combustion chamber** made of stainless steel
- **Heat exchangers**, patented by ROBUR, made of special light alloy, fining horizontally on the air side and vertically on the flue side with extremely high capacity of thermal exchange
- **Steel casing** painted with epoxy powders
- **Centrifugal fan/s** with high air flow capacity.

SAFETY AND CONTROL DEVICES

- **High temperature limit switch**: 100 °C with manual reset (prevents the overheating of the heat exchangers).
- **Pressure differential switch**: when the flue exhaust/air intake ducts are obstructed, the appliance is stopped.
- **Gas solenoid valve**: in the case that one of the safety devices is activated (limit thermostat, safety thermostat, etc.) the gas valve is electrically de-energised with contemporary cut-off of the burner gas supply.
  - Supply voltage: 230 V - 50 Hz
  - Operating temperature: 0 °C to +60 °C
  - Model: SIT 822 Novamix
- **Ignition and flame control box**: it controls the ignition and flame of the premix burner; if there is flame not detected during the safety period the flame control box will stop the appliance; with manual reset.
- Safety time: 5 seconds
- Pre-purge time: 40 seconds
- Power supply: 230 V - 50 Hz
- Model: Bertelli & Partners DIMS03 with ignition transformer BRAHMA TC2LTCAF

1.4 TECHNICAL CHARACTERISTICS

MODEL		U.M.	F2 80 C
APPLIANCE CATEGORY			$II_{2H3B/P}$
APPLIANCE TYPE			C_{13} - C_{33} – C_{53} – C_{63} - B_{23}
FEED GAS			Natural Gas - L.P.G.
NOMINAL HEAT INPUT		kW	80
NOMINAL HEAT OUTPUT		kW	73.6
NOMINAL GAS CONSUMPTION (15° C – 1013 mbar)	NATURAL GAS L.P.G. G30 L.P.G. G31	m^3/h kg/h kg/h	8,47 6,31 6,22
RATED EFFICIENCY		%	92
INLET GAS PRESSURE	NATURAL GAS L.P.G. G30 L.P.G. G31	mbar	20 30 30
GAS INLET DIAMETER		“	¾ F
INTAKE PIPE DIAMETER		mm	80
EXHAUST PIPE DIAMETER		mm	80
SUPPLY VOLTAGE			400 V 3 N – 50 Hz
WATTAGE		kW	2,3
OPERATING TEMPERATURE (1)		°C	0 / + 35°C
FUSE		A	6,3
AIR FLOW (2)		m^3/h	8.500
AIR FLOW (AT THE MAX LOSS PRESSURE)		m^3/h	5.800
MAX PRESSURE HEAD(3)		Pa	250
TEMPERATURE RATE		K	25,6 / 37,6
WEIGHT		kg	165

Table 3 – Technical characteristics

1 *WARNING: THE ROOM OPERATIONAL TEMPERATURE IS BETWEEN 0 °C AND +35 °C*
THE APPLIANCE'S COMPONENTS OPERATIONAL TEMPERATURE IS BETWEEN 0 °C AND +60 °C

2 *AT 20 °C – 1013 mbar*

3 *FOR MORE INFORMATION ABOUT THE AVAILABLE PRESSURE HEAD PLEASE SEE PARAGRAPH 3.4 – DUCTING SYSTEM PRESSURE DROP FOR DISTRIBUTION/INTAKE AMBIENT AIR AT PAGE 30.*

1.5 DIMENSIONS OF THE F2 C SERIES GAS FIRED UNIT HEATERS

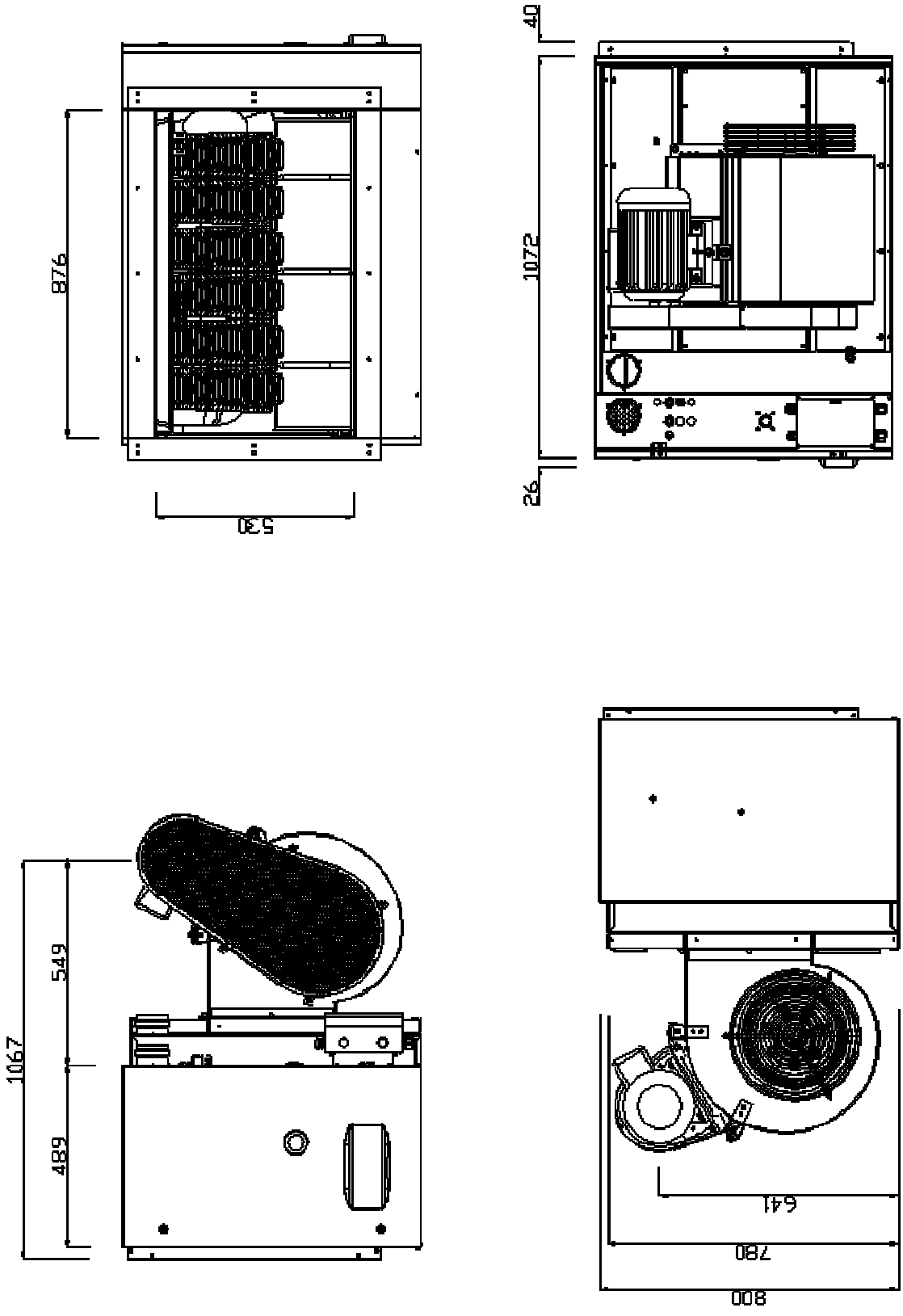


Figure 1 – Dimensions of F2 80 C

SECTION 2: END USER

In this section you can find all the necessary instructions for a correct operation of the F2 C Series gas fired unit heaters.
The operation of the F2 C Series gas fired unit heaters are governed by a room thermostat (not supplied but available as accessory) and the remote control provided with the heater (see Figure 2).
Here below you can find all the necessary instructions for the correct use of the remote control.

2.1 FUNCTIONS OF THE REMOTE CONTROL KEYS

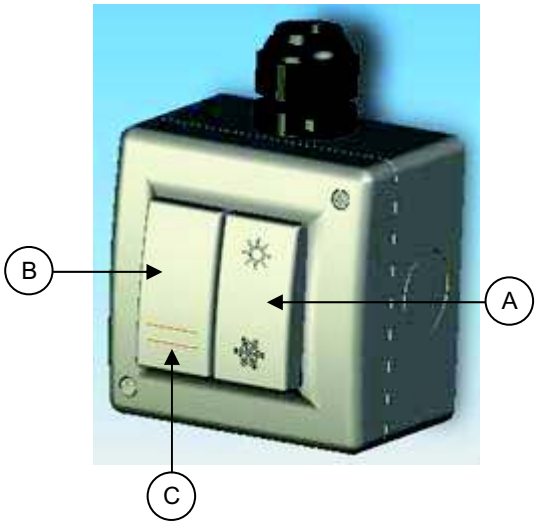


Figure 2 – Remote control

The remote control keys have the following functions:

- Key (A): SUMMER/WINTER SELECTION.
  Allows to select the “Winter” or “Summer” operation.
  Winter operating mode status (❄) for winter heating.
  Summer operating mode status (✲) for summer cooling (the burner is off, ONLY the fan/s is/are on).
- Key (B): RESET BUTTON.
  Allows to resume normal operation of the heater.
  Led (C): LOCKOUT/FAULT INDICATOR LIGHT (═).(═).
  Allows to signal the heater lockout condition and identify the fault (cause which determines the lockout condition).

For reset instructions and anomaly detection refer to 5.4 FAULT LOCATION of page 42.

2.2 HOW TO TURN ON AND OFF THE HEATER

☞ The heater must be turn on for the first time by ***qualified service engineers***.
Before starting the heater, qualified service engineers must check that:

- the rating data are compatible with those of the gas and power supply lines;
- the calibration is compatible with the heater power;
- the flue exhaust duct is working properly;
- the combustion air intake and flue exhaust are carried out correctly according to the existing standards.

WINTER OPERATION (HEATING)

To Have: the heater connected to the gas and power supply lines.

1 - Set the room thermostat to the maximum value.

2 - Open the main gas cock.

3 - Power the appliance by closing the 2-pole switch (to be supplied by the electrical installation technician).

4 - Set the winter/summer key (A) of the remote control to the winter (❄) position (see Figure 2 at page 13).

5 - After the pre-purge time (about 40 seconds), the gas solenoid valve opens and the heater is turned on.

6 - If the flame is present, the control box keeps the gas valve open.

7 - Otherwise, the flame control box locks out the appliance by switching on the lock out warning light C on the reset button B (see Figure 2 at page 13).

8 - When the condition at point 7 takes place, push the reset button B.

9 - If the heater is turned on correctly set the room thermostat to the desired value.

If the heater is switched on after a long period of inactivity or at the first start-up of the appliance you may need to repeat several times the operation because there is air in the pipes.

SWITCHING-OFF

To Have: the heater connected to the gas and power supply lines.

10 - To turn off the heater set the room thermostat to the minimum value. The burner will turn off, while fans will continue to work until the appliance is completely cooled.

☞ It is absolutely forbidden to turn off the heater by cutting the power off since this operation can damage the appliance. If you cut the power to the heater the axial fans stop working immediately and the limit thermostat is activated. This last shall be reset manually.

In case of a long period of inactivity, after the above operation and after the axial fans are turned off, close the main gas cock and cut out the power by means of the 2-pole switch placed on the power supply line.

SUMMER OPERATION (COOLING)

To Have: the heater connected to the gas and power supply lines.

1 - Close the main gas cock and energize the appliance by closing the 2-pole switch (to be supplied by the electrical installation technician).

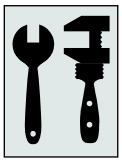
2 - Set the winter/summer key (A) of the remote control to the (☼) position (see Figure 2). In this way, with the burner off, ONLY the axial fan continues to work by moving the ambient air.

SEASON SHUTDOWN

1 - Turn the appliance off (as described in the SWITCHING-OFF Paragraph) and wait until the axial fans stop.

2 - Close the main gas cock upstream the appliance.

3 - If you do not need to use the SUMMER function, cut the power off to the appliance by means of the 2-pole switch located on the power supply line.



SECTION 3: PLUMBING INSTALLER

In this section you can find all the necessary instructions to install F2 C Series heaters from the hydraulic point of view.

3.1 GENERAL HEATER INSTALLATION REQUIREMENTS

The installation shall be made, according to the Manufacturer's instructions, by **qualified service engineers**.

By **Qualified Service Engineers** we mean the personnel with specific technical skills in the field of the heating system components. In any case, if you need more information please contact the Pre-Sale Department of ROBUR S.p.A. (tel. +39 035/888111).

An incorrect installation can cause damages to people, animals and property. In case of erroneous installation, the Manufacturer cannot be held responsible for such damages.

The installation must be performed in compliance with the existing national regulations. For the installation it is necessary to respect the following instructions:

- Dimension the duct system and the warm air and intake air diffusers taking into consideration the characteristics of air flow, head pressure of the centrifugal fan, and type of pulley utilised.
- In order to obtain the maximum comfort and efficiency from the installation it is suggested to respect the following rules:
  - Be careful that the air blowing out from the diffusers do not invest directly the people
  - Take into consideration the presence of obstacles (i.e. pillars).
- It is not recommended the installation of F2 C series in greenhouses or ambient with high rate of humidity or similar atmospheric conditions because these units have not been designed for this type of installation.

3.2 INSTALLATION SEQUENCE

Install the gas supply lines, the electric power lines, as well as the flue exhaust openings and the combustion air inlet according to the approved installation project.

1 - Unpack the unit carefully checking that it has not been damaged during transport; every unit is factory tested before shipment, therefore, if there are damages report them immediately to the carrier.

2 - Make sure that an adequate gas supply from an efficient gas network is provided, particularly if the unit is supplied with:
Natural Gas
Be sure that the pressure of the gas network, with the unit in operation, is set at 20 mbar (204 mm H_2O) (allowed tolerance between 17 mbar and 25 mbar).

L.P.G. (Propane – Butane Mix)

For the first pressure drop required in the supply, it is advisable to install a pressure regulator near the liquid gas tank so as to reduce the pressure to 1.5 bar. A pressure regulator for a second pressure drop should be placed near the heater to reduce the pressure from 1.5 bar to 30 mbar (306 mm H_2O) (allowed tolerance between 20 mbar and 35 mbar).

L.P.G. (Pure Propane)

For the first pressure drop required in the supply, it is essential to install a pressure regulator near the liquid gas tank so as to reduce the pressure to 1.5 bar. A pressure regulator for a second pressure drop should be placed near the heater to reduce the pressure from 1.5 bar to 30 mbar (306 mm H_2O) (allowed tolerance between 20 mbar and 35 mbar).

☞ In case of doubt on the composition of the GPL used, adjust the appliance as for the propane-butane mix.

3 - Connect the heater to the gas supply line by equipping the gas supply pipe with a shut-off cock and a three-piece union.

4 - Connect the flue pipe to the flue exit of the heater and eventually the external air pipe for the combustion with ring for air intake.

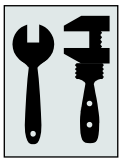
5 - Connect the flange of the heater to the duct for the distribution of the warm air and the mixing chamber with eventual ducts previewed for the intake air external and/or internal.

6 - Verify that the sum of the losses of the ducting system will be between the values indicated in the Table 7 at page 31.

3.3 SIZE AND INSTALLATION OF THE AIR INLET/FLUE EXHAUST PIPES

F2 C Series gas fired unit heaters can be installed as follows

- **C_{13}** type installation: room sealed combustion circuit appliance with inlet air supply and outlet of exhaust gases, either separated (see Figure 3, Figure 4, Figure 5, Figure 6 and Figure 7 starting from page 21). This type of installation is sealed regarding the heated room.
- **C_{33}** type installation: room sealed combustion circuit appliance with inlet air supply and outlet of exhaust gases, either separated or concentric ducts (see Figure 8 at page 23) on the ROOF. This type of installation is sealed regarding the heated room.
- **B_{23}** type installation: this appliance must be connected to a flew which draws the exhaust gases to the outside, through a proper duct; while, the combustion air is taken directly from the room. This exhaust flue duct can be either horizontal or vertical. This type of installation is not sealed regarding the heated room (see Figure 9, Figure 10, Figure 11, Figure 12, Figure 13 and Figure 14 starting from page 24).



- **C_{53}** type installation: room sealed combustion circuit appliance with inlet air supply and outlet of exhaust gases by using separated ducts on different WALLS of the building and far the one from the other: for example, the air inlet duct from the wall behind the appliance and the flue exhaust duct far from the appliance or on the roof (see Figure 15, Figure 16, Figure 17, Figure 18 and Figure 19 starting from page 27).
- **C_{63}** type installation: allows to install air inlet/flue exhaust systems, by using certified ducts, elbows and terminals purchased on the market. Moreover, it permits to use pipe diameters bigger than 80 mm: for example when the installation requires using the pipe of the larger diameter, caused by the longer ducts. With this typology, for the calculus of the flue/air inlet system refer to the duct Manufacturer data and furthermore to the flue composition, flow and temperature (see Table 4 at page 20).

In the case the flue pipe system is installed to the wall and the one of the intake air of the centrifugal fan is installed outdoor on the same wall, it is OBBLIGATORY to have the flue pipe system at a distance of 1,5 m at least from the external intake air pipe, in order to avoid that the combustion products will return in the ambient heated.

In any case, use only approved ducts for the installation of the units. Upon request, ROBUR S.p.A. can supply approved rigid pipes, coaxial pipes and terminals.

To determine the correct size of the piping system, its total pressure drop has to be calculated.

Data to calculate the pressure drop for the air intake/flue exhaust system supplied on request by *Robur SpA* are in Table 5 and Table 6 at page 20.

External terminals pressure drops are negligible since they are very low.

During the project design phase it is necessary to verify that the total inlet/outlet pipes pressure drops are lower than the maximum pressure drop allowed by the appliance (see Table 4).

The maximum lengths of the air supply and flue exhaust ducts, for different types of installation, are given from Figure 3 to Figure 19. The above-mentioned length values are APPROXIMATE and only for standard installations where the air supply and flue exhaust ducts follow a linear path as shown in the relevant figures. Otherwise, you need to calculate pressure drops.

☞ When vertical flue pipes are installed, to prevent that condense drops enter the extraction fan, on the base of the vertically mounted flue pipe a T-shaped piece must be fitted in order to collect the condense.

DATA TO CALCULATE THE PRESSURE DROP FOR AIR INTAKE/FLUE EXHAUST PIPES PURCHASED ON THE MARKET					
Mod.	**Texhaust fume Temperature °C**	**Flue Flow (Weight) kg/h**	**Flue CO_2 (%)**		**Maximum Allowed Pressure Drop (Pa)**
			Natural Gas	**LPG**	
F2 80 C	170	140	9,2 – 9,4	10,7	150

Table 4 – Data to calculate the pressure drop for air intake/flue exhaust pipes purchased on the market

DATA TO CALCULATE THE PRESSURE DROP FOR THE AIR INTAKE/FLUE EXHAUST SYSTEM WITH Ø 80 OR Ø 100 PIPES SUPPLIED								
Mod.	**Component pressure drop Ø 80**				**Component pressure drop Ø 110**			
	pipe (Pa/m)		**elbow 90° (Pa)**		**pipe (Pa/m)**		**elbow 90° (Pa)**	
	flue	**air**	**flue**	**air**	**flue**	**air**	**flue**	**air**
F2 80 C	20	15	26	20	6	2,4	10	6

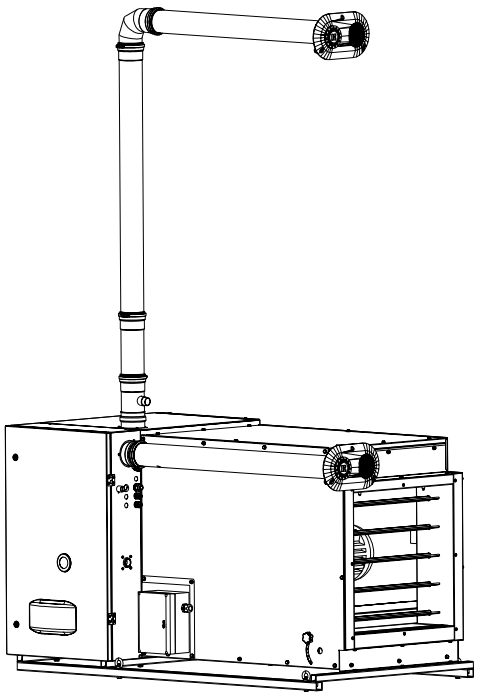
Table 5 – Data to calculate the pressure drop for the air intake/flue exhaust system with Ø 80 or Ø 100 supplied on request by *Robur SpA*

DATA TO CALCULATE AIR/FLUE SYSTEM WITH PIPES Ø 130 SUPPLIED ON REQUEST BY ROBUR S.P.A.						
Mod.	**Component pressure drop Ø 130**					
	pipe (Pa/m)		**elbow 90° (Pa)**		**Coaxial (Pa)**	**Condense loss (Pa) (O-SCR013)**
	flue	**air**	**flue**	**air**	**To the roof (O-KTC001)**	
F2 80 C	2,7	1,2	7	2	32	1,5

Table 6 – Data to calculate the pressure drop for the air intake/flue exhaust system with Ø 130 supplied on request by *Robur SpA*

For each 45° elbow an increment of 1.2 m in length of the pipe on which it has been installed should be added (e.g. if the 45° elbow has been mounted on an air intake pipe, which is 2 m long, to calculate the pressure drop you should consider a total air intake pipe length of 3.2 m).

C13 INSTALLATION W/Ø 80 SEPARATE PIPES

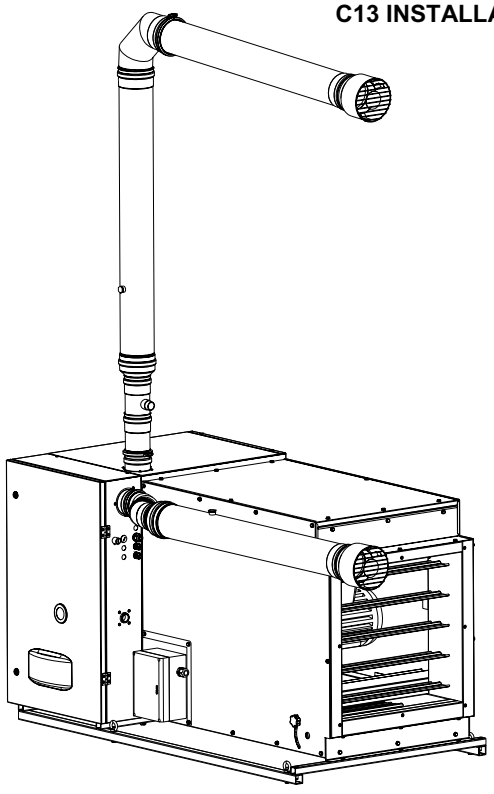


MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 80
F2 80 C	INSTALLATION NOT POSSIBLE	

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

Figure 3 – Installation type C13 with mixing chamber (optional) with separate pipes Ø 80

C13 INSTALLATION W/Ø 110 SEPARATE PIPES

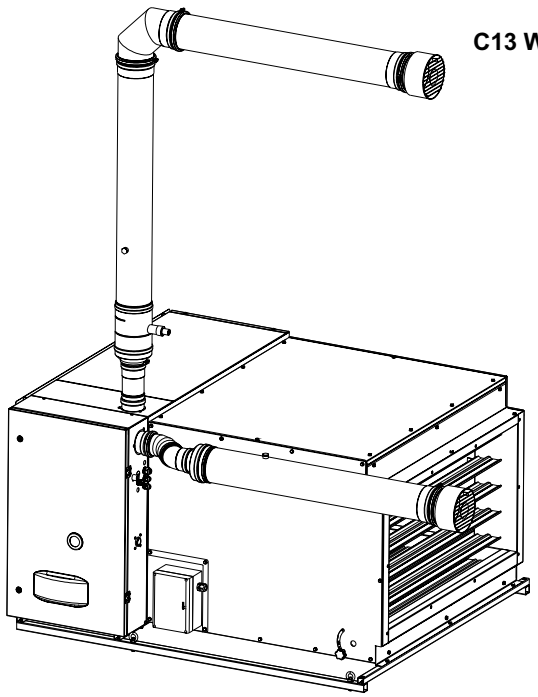


MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 110	FLUE PIPE Ø 110
F2 80 C	10	10

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

*For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 4 – Installation type C13 with mixing chamber (optional) with separate pipes Ø 110



C13 WALL COAXIAL INSTALLATION W/Ø 130 PIPES

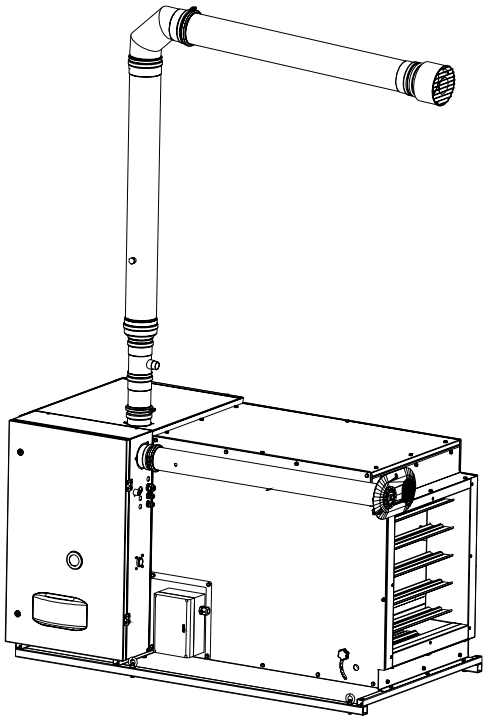
MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 130	FLUE PIPE Ø 130
F2 80 C	20*	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 5 – Installation type C13 with mixing chamber (optional) with separate pipes Ø 130

INSTALLATION C13 C/AIR PIPE Ø 80 AND FLUE PIPE Ø 110



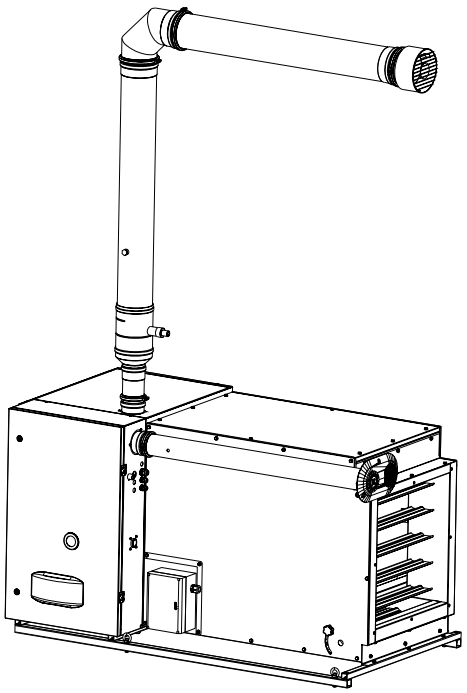
MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 110
F2 80 C	3	11

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 6 – Installation type C13 with mixing chamber (optional) with air pipe Ø 80 and flue pipe Ø 110

INSTALLATION C13 C/AIR PIPE Ø 80 AND FLUE PIPE Ø 130

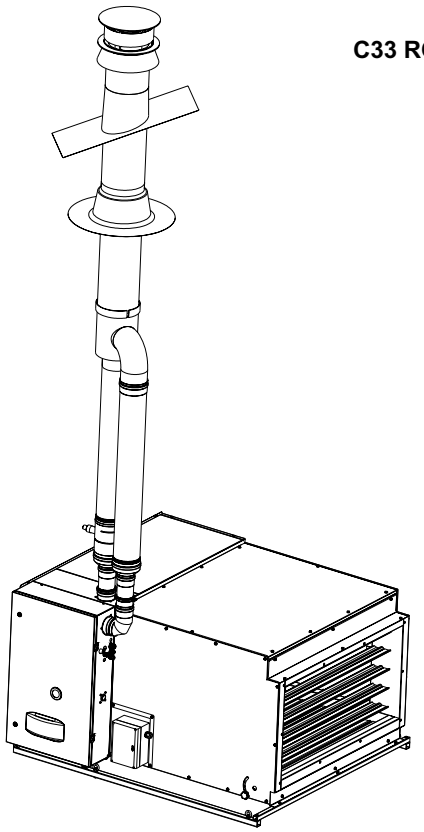


MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 130
F2 80 C	3	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 7 – Installation type C13 with mixing chamber (optional) with air pipes Ø 80 and flue pipes Ø 130



C33 ROOF COAXIAL INSTALLATION (Cod. O-KTC001)

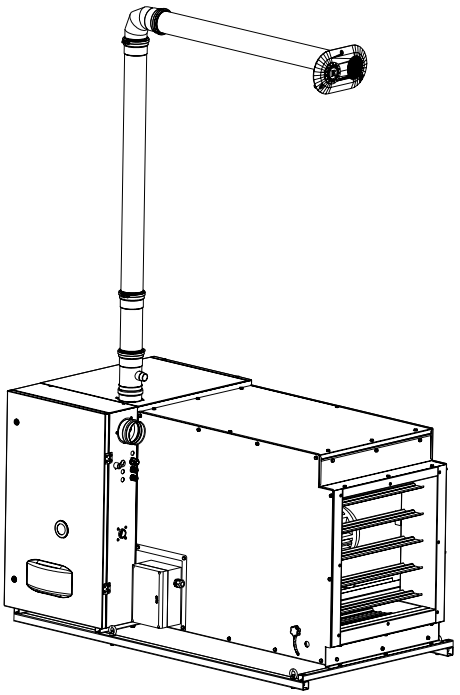
MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 130	FLUE PIPE Ø 130
F2 80 C	20*	20*

CAUTION: the above-listed lengths are applicable only if the air and flue pipes follow a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 8 – Installation type C33 with mixing chamber (optional) with separate pipes Ø 130

B23 INSTALLATION W/Ø 80 FLUE PIPE

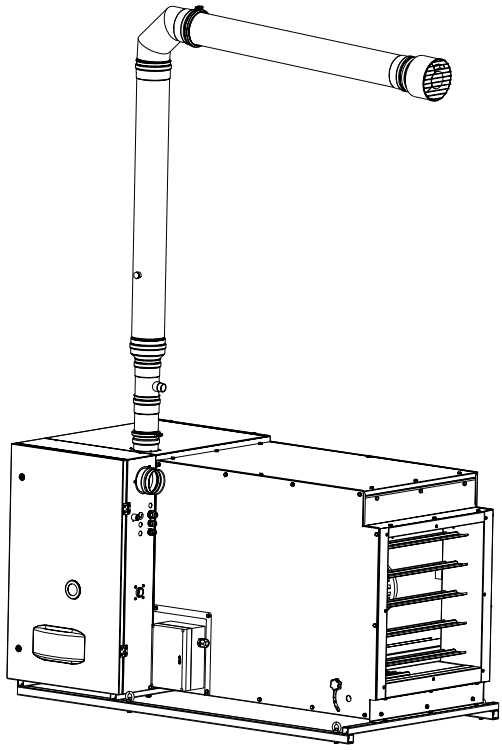


MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 80
F2 80 C	INSTALLATION NOT POSSIBLE

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

Figure 9 – Installation type B23 with mixing chamber (optional) with flue pipe Ø 80

B23 INSTALLATION W/Ø 110 FLUE PIPE



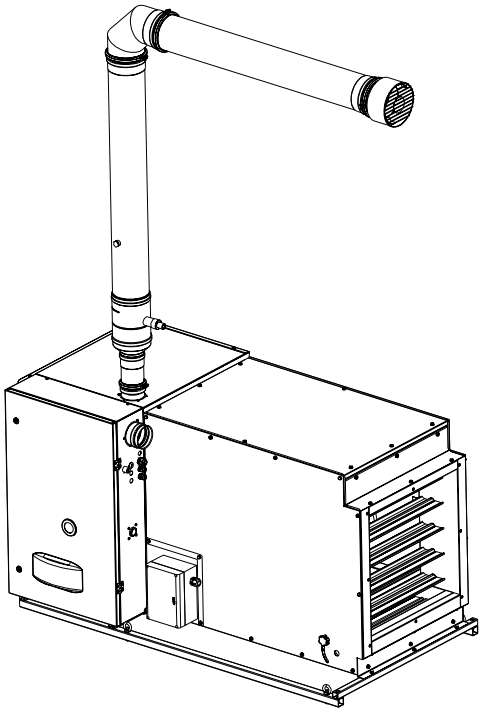
MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 110
F2 80 C	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 10 – Installation type B23 with mixing chamber (optional) with flue pipes Ø 110

B23 INSTALLATION C/FLUE PIPE Ø 130



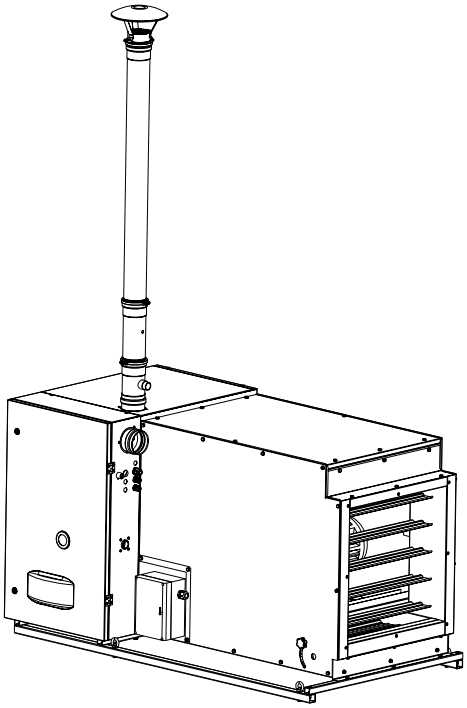
MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 130
F2 80 C	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 11 – Installation type B23 with mixing chamber (optional) with flue pipes Ø 130

B23 INSTALLATION C/ROOF FLUE PIPE Ø 80

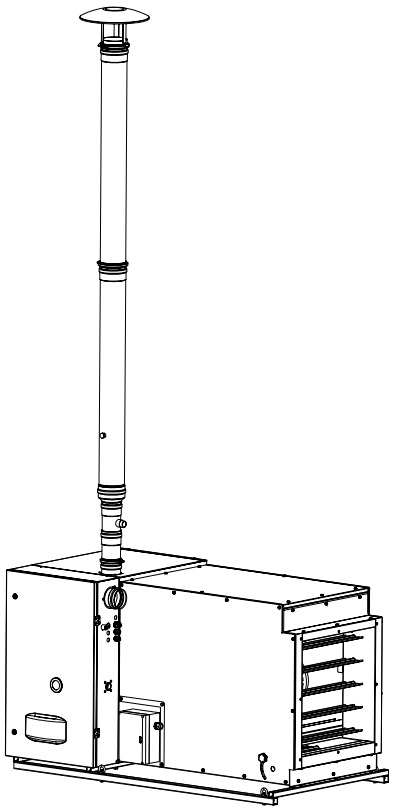


MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 80
F2 80 C	INSTALLATION NOT POSSIBLE

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

Figure 12 – Installation type B23 with mixing chamber (optional) with roof flue pipes Ø 80

B23 INSTALLATION W/Ø 110 ROOF FLUE PIPE



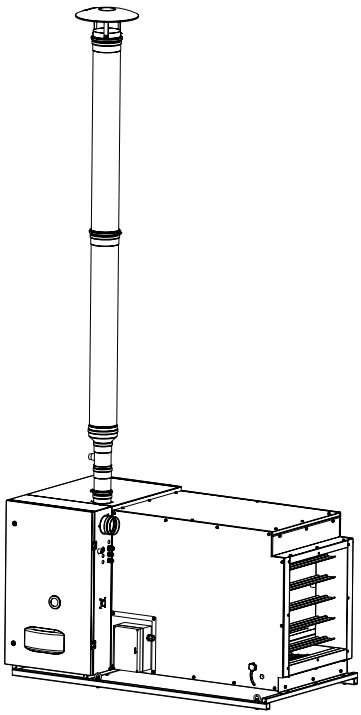
MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 110
F2 80 C	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 13 – Installation type B23 with mixing chamber (optional) with roof flue pipes Ø 110

B23 INSTALLATION C/ROOF FLUE PIPE Ø 130



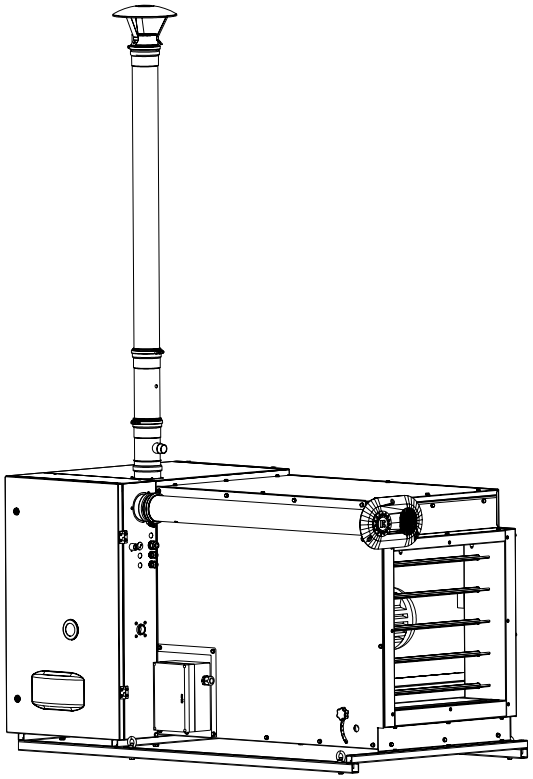
MAXIMUM ALLOWED LENGTHS (m)	
	FLUE PIPE Ø 130
F2 80 C	20*

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 14 – Installation type B23 with mixing chamber (optional) with roof flue pipes Ø 130

C53 INSTALLATION W/Ø 80 PIPES



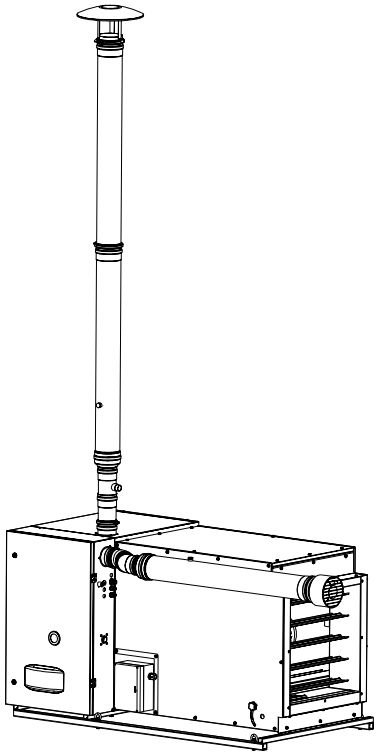
MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 80
F2 80 C	INSTALLATION NOT POSSIBLE	

CAUTION: the above-listed lengths are applicable only if the flue pipe follows a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 15 – Installation type C53 with mixing chamber (optional) with pipes Ø 80

C53 INSTALLATION W/Ø 110 PIPES

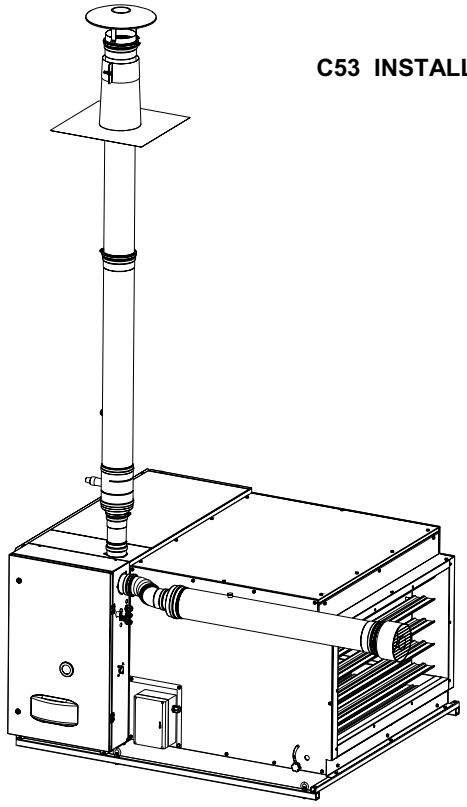


MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 110	FLUE PIPE Ø 110
F2 80 C	14	14

CAUTION: the above-listed lengths are applicable only if the air and flue pipes follow a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 16 – Installation type C53 with mixing chamber (optional) with pipes Ø 110



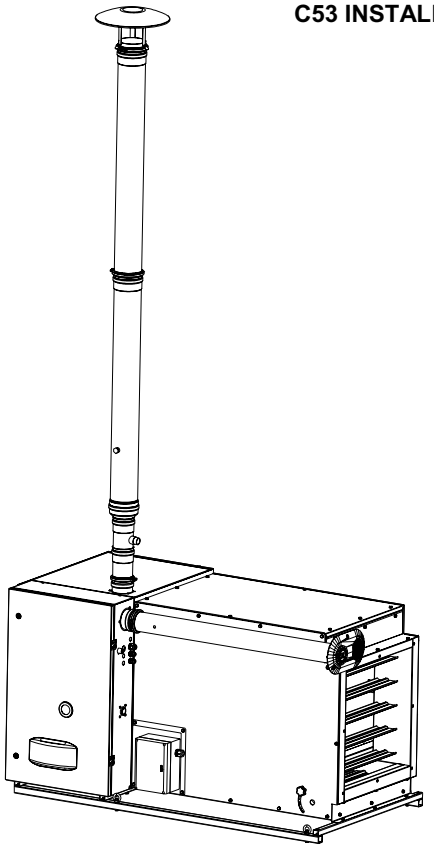
C53 INSTALLATION C/PIPES Ø 130

MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 130	FLUE PIPE Ø 130
F2 80 C	20*	20*

CAUTION: the above-listed lengths are applicable only if the air and flue pipes follow a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 17 – Installation type C53 with mixing chamber (optional) with pipes Ø 130



C53 INSTALLATION C/AIR PIPE Ø 80 AND FLUE PIPE Ø 110

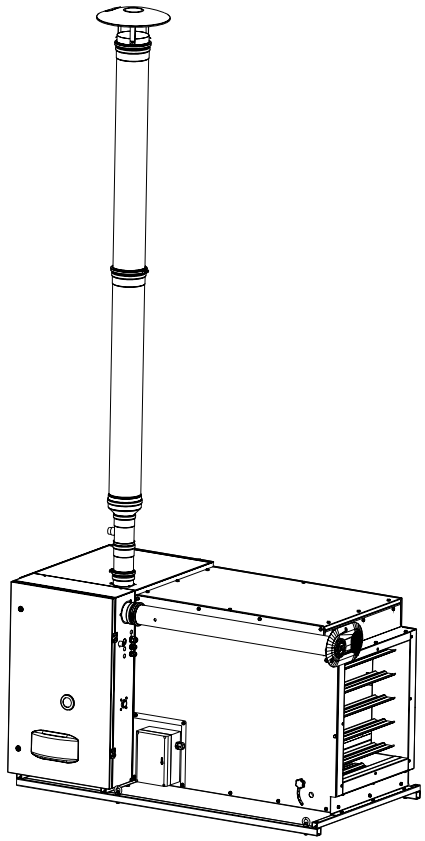
MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 110
F2 80 C	3	13

CAUTION: the above-listed lengths are applicable only if the air and flue pipes follow a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 18 – Installation type C53 with mixing chamber (optional) with air pipe Ø 80 and flue pipe Ø 110

C53 INSTALLATION C/AIR PIPE Ø 80 AND FLUE PIPE Ø 130



MAXIMUM ALLOWED LENGTHS (m)		
	AIR PIPE Ø 80	FLUE PIPE Ø 130
F2 80 C	3	20*

CAUTION: the above-listed lengths are applicable only if the air and flue pipes follow a linear path as shown in Figure. Otherwise, you need to calculate the relevant pressure drops.

* For installations with pipes length more than 20 meters we kindly advise to contact pre-sale service of Robur S.p.A.

Figure 19 – Installation type C53 with mixing chamber (optional) with air pipe Ø 80 and flue pipe Ø 130

3.4 DUCTING SYSTEM PRESSURE DROP FOR DISTRIBUTION/INTAKE AMBIENT AIR

F2 C gas fired unit heater is equipped with a diam 224mm pulley and n. 1 diam. 200 mm pulley (not mounted).

During the installation verify that the sum of the pressure drop of the ducting system for the distribution of the warm air and the pressure drop of the internal/external air intake duct system is between the values indicated in the chart of the Table 7.

On the contrary it is necessary to replace the standard pulley mounted on the fan with the pulley furnished, following the instructions here below.

1 - Cut the gas and the electrical supply.
2 - Take off the belt cover of the fan.
3 - Unbolt the screw A (see Figure 20) to release the tension of the belt, then remove it.
4 - Remove the two grains M6 (see ref. B of Figure 20).
5 - Screw completely one of the two grains previously removed in the hole C.
6 - Remove the chronic spider D.
7 - Replace the pulley and the belt with the ones furnished.
8 - Be careful in positioning the plan of the replaced pulley with the one of the pulley adjusted on the drive shaft.
9 - Screw the two grains M6 in the holes B.
10 - Unbolt the screw A to tension the belt.
11 - Remount the belt cover of the fan.

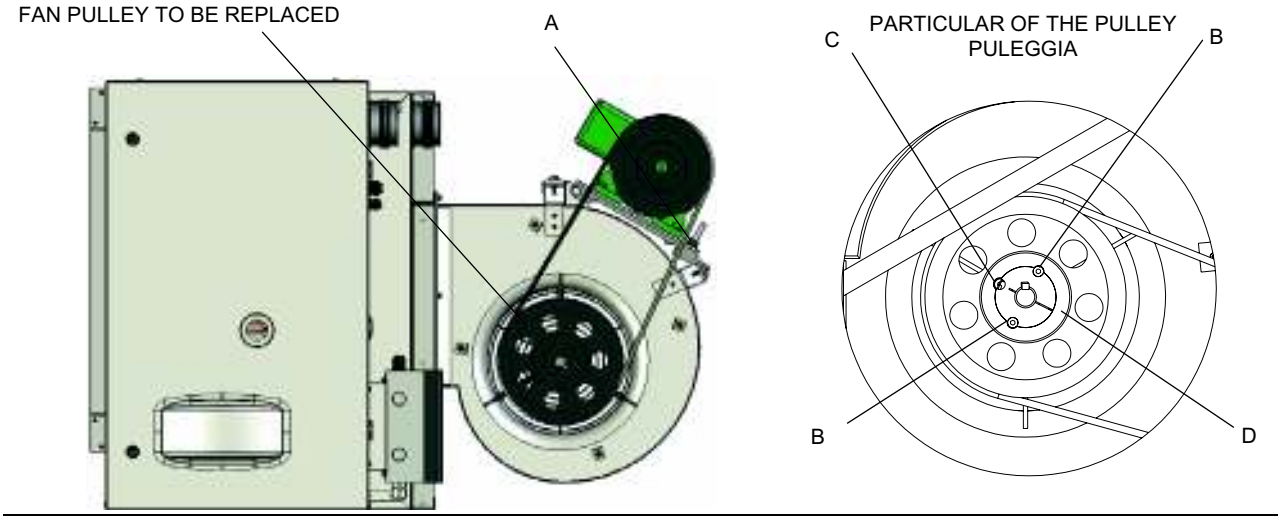
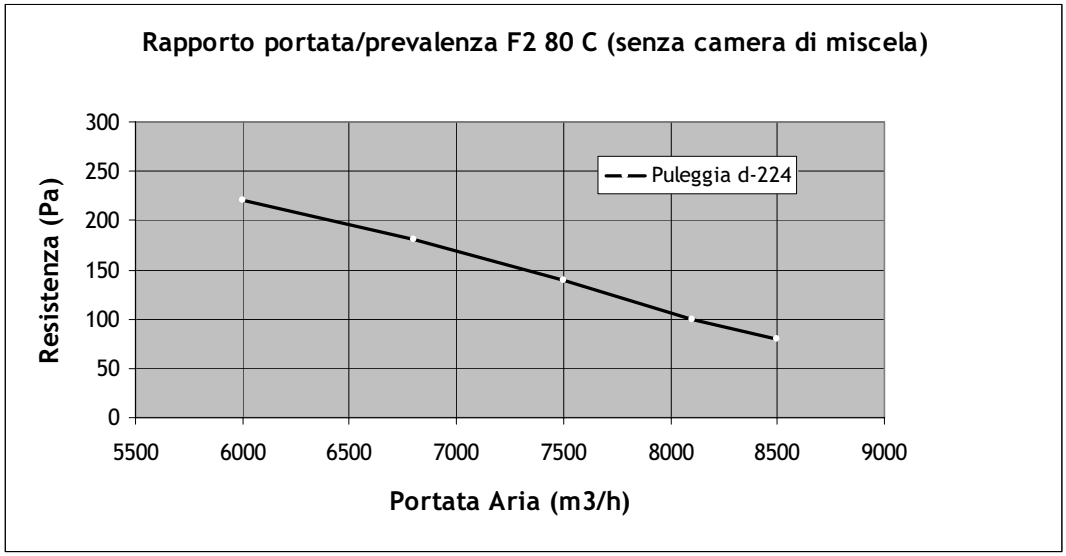


Figure 20 – Fan pulley



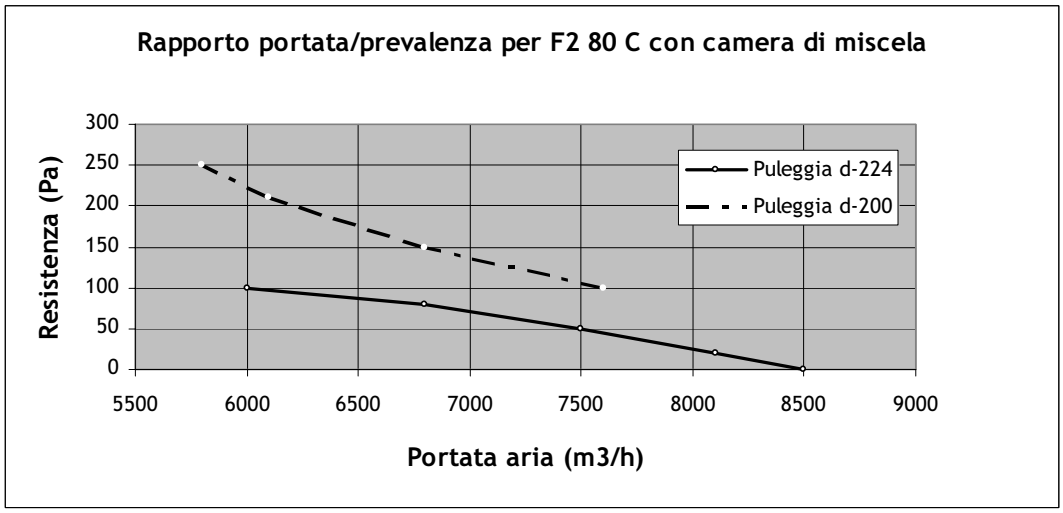


Table 7 – Range available pressure drop

SECTION 4: ELECTRICAL INSTALLATION TECHNICIAN

In this section you can find all the necessary instructions to make the electrical connections for the F2 C Series gas fired unit heaters.

4.1 HOW TO CONNECT THE HEATER TO THE POWER SUPPLY

To Have: the heater installed.

The electrical connections must be made by **qualified personnel**. Before performing this operation, cut off the electrical supply.

1 - Check that the supply voltage is 400V / 50Hz. 3 phase plus N.

2 - Make the electrical connections according to the installation wiring diagram (see Figure 22 at page 36) by using a FG7 5x1,5 mm^2 type cable with maximum outer diameter of 14 mm.

3 - Make the electrical connection by paying attention that the ground cable is longer than the energised cables. The ground cable will be the last to be broken if the power cord is accidentally stretched and therefore a good ground continuity is ensured.

The appliance is electrically safe when it is properly grounded in compliance with the existing security regulations. Do not use gas pipes as earth for electrical appliances.

4 - The heater must be connected to the power supply line by a 4- pole switch 4x10 A

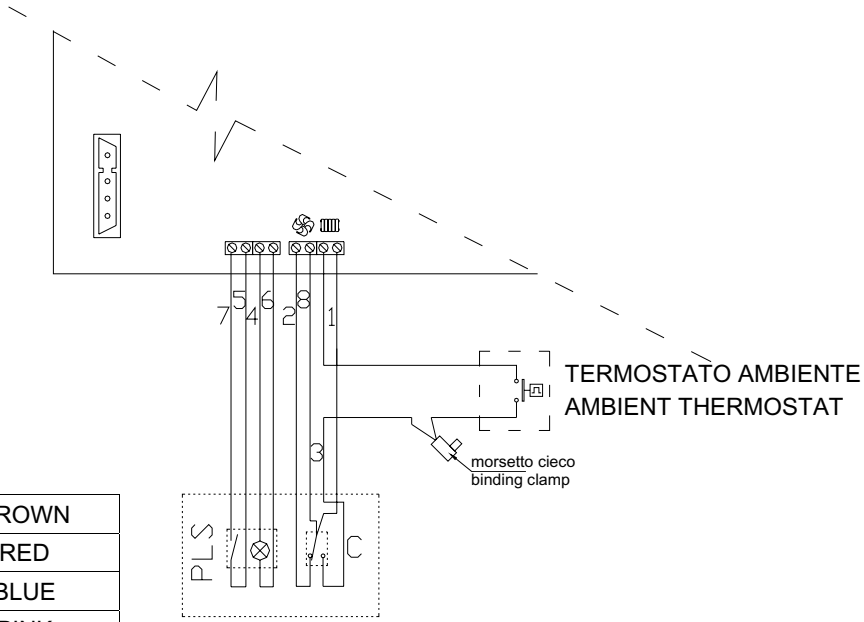
4.2 HOW TO INSTALL THE ROOM THERMOSTAT

The electrical connections must be made by **qualified personnel**. Before performing this operation, cut off the electrical supply.

To install the room thermostat (available as accessory) proceed as follows:

1. Find the position where to install the room thermostat by trying to place it at 1.5 m approximately from the floor, protected from air currents, direct sunlight exposure, direct heating sources (lamps, hot air flows) and possibly **NOT on walls adjacent to the outside** so as to avoid skewing the temperature readings and then the system operation. **IN SUCH A WAY YOU CAN AVOID UNDESIRED START-UPS AND STOPS OF THE SYSTEM AND ENSURE AN OPTIMUM COMFORT IN THE ROOM.** If this is not possible, shield the room thermostat by interposing a sheet of insulating material (cork, polystyrene or other) between this last and the wall.
2. Disconnect the blue cable 3 from the terminal strip of the fan control board and connect it by means of a blind terminal to the first cable of the room thermostat; connect the second cable of the room thermostat to the free terminal (see the installation wiring diagram of Figura 21).

It is possible to control multiple heaters with only one external consensus (e.g. analogical programmable thermostat, clock programmer, room thermostat, etc.) as indicated in Figure 23 and Figure 24 from page 37.



1	MARRONE	BROWN
2	ROSSO	RED
3	BLU	BLUE
4	ROSA	PINK
5	GRIGIO	GREY
6	GIALLO	YELLOW
7	VERDE	GREEN
8	BIANCO	WHITE

Figura 21 – Remote control and room thermostat wiring diagram

4.3 HOW TO INSTALL THE REMOTE CONTROL BOX

The electrical connections must be made by **qualified personnel**. Before performing this operation, cut off the electrical supply.

To install the remote control box proceed as follows:

1. Fix the control box in the desired position(maximum distance 200 metres from the gas unit heater) by means of expansion bolts.
2. The remote control is already supplied connected to the heater control board by means of a 5 metre cable (FROH 8 X 1 mm2).
3. For greater lengths use the same type of cable.

It is possible to control multiple heaters with only one external consensus (e.g. analogical programmable thermostat, clock programmer, room thermostat, etc.) as indicated in Figure 23 and Figure 24 at page 37.

To check if the heater works properly proceed as described here below:

1. Set the key A to summer (☼ symbol, see Figure 2 at page 13) and check the correct operation of the summer mode (the burners remains off while the fans are running).
2. Set the key A to winter (❄ symbol, see see Figure 2 at page 13) and check the correct operation of the winter mode (for more information refer to Paragraph “WINTER OPERATION (HEATING)” at page 14).
3. Cut off the gas supply and check after a few seconds that the lock out warning light C on the control box lights up (see see Figure 2 at page 13).
4. Then verify that, by reconnecting the gas supply and pressing the reset button B (Figure 2 at page 13) the warning light C goes out and the unit restarts.

Installation wiring diagram

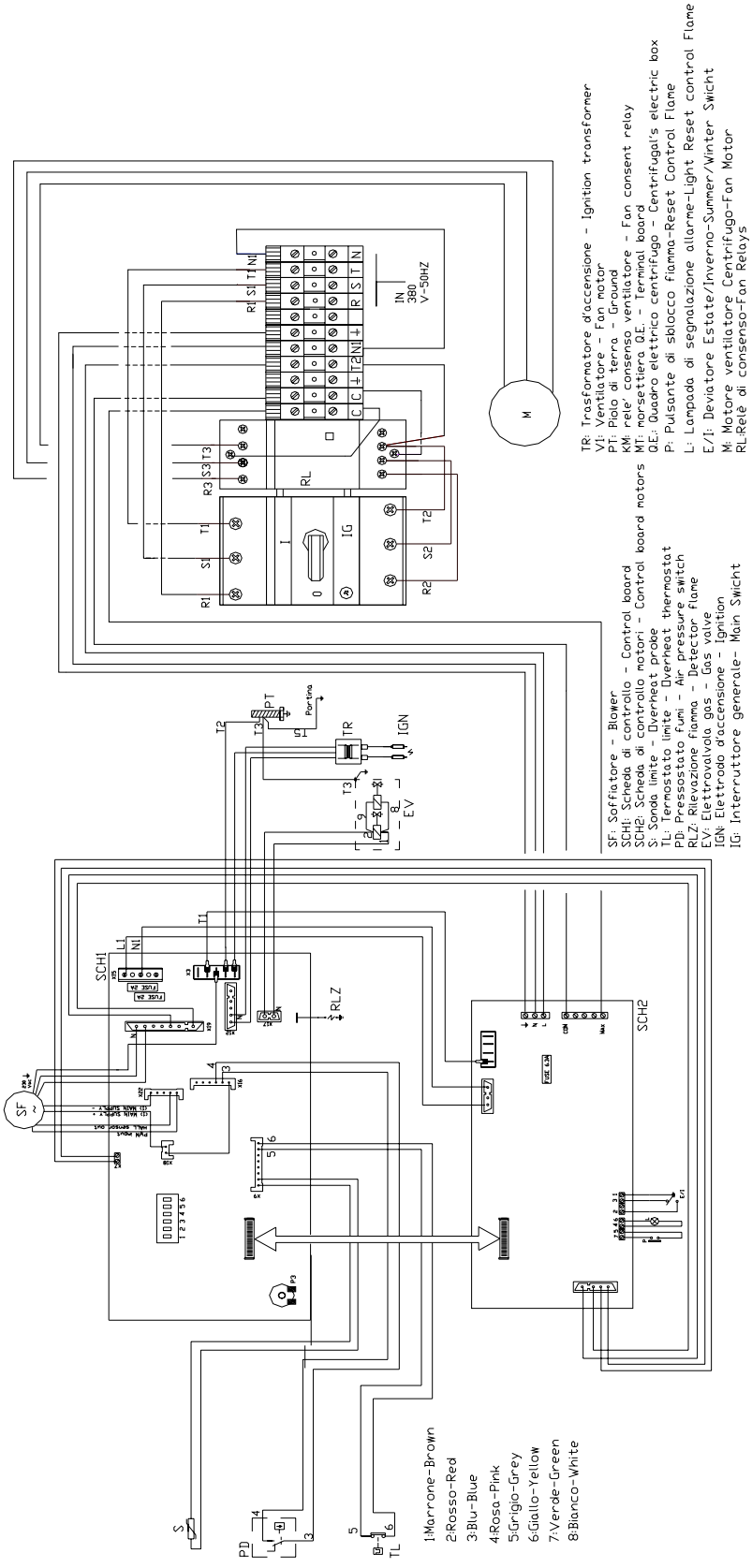

TR: Trasformatore d'accensione - Ignition transformer
V1: Ventilatore - Fan motor
PT: Piolo di terra - Ground
KM: rele' consenso ventilatore - Fan consent relay
MT: morsettiera Q.E. - Terminal board
Q.E.: Quadro elettrico centrifugo - Centrifugal's electric box
P: Pulsante di sblocco fiamma-Reset Control Flame
L: Lampada di segnalazione allarme-Light Reset control Flame
E/I: Deviatore Estate/Inverno-Summer/Winter Swicht
M: Motore ventilatore Centrifugo-Fan Motor
RL:Relè di consenso-Fan Relays
SF: Soffiatore - Blower
SCH1: Scheda di controllo - Control board
SCH2: Scheda di controllo motori - Control board motors
S: Sonda limite - Overheat probe
TL: Termostato limite - Overheat thermostat
PD: Pressostato fumi - Air pressure switch
RLZ: Rilevazione fiamma - Detector flame
EV: Elettrovalvola gas - Gas valve
IGN: Elettrodo d'accensione - Ignition
IG: Interruttore generale- Main Swicht
1:Marrone-Brown
2:Rosso-Red
3:Blu-Blue
4:Rosa-Pink
5:Grigio-Grey
6:Giallo-Yellow
7:Verde-Green
8:Bianco-White

Figure 22 – Installation wiring diagram of F2 C series heaters

Wiring diagram for multiple heaters installation with one programmer

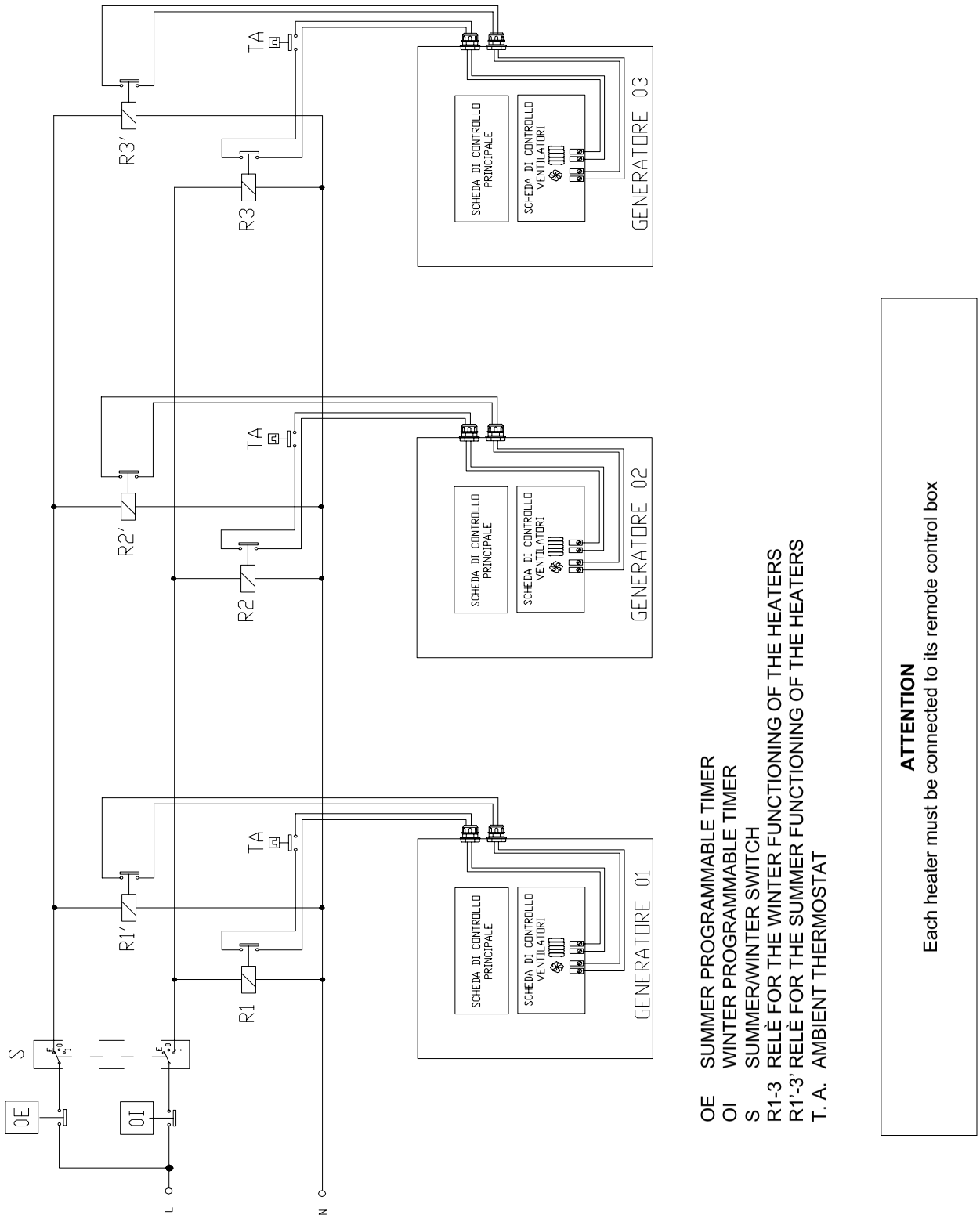


Figure 23 – Wiring diagram for multiple heaters installation with one programmer and several room thermostats

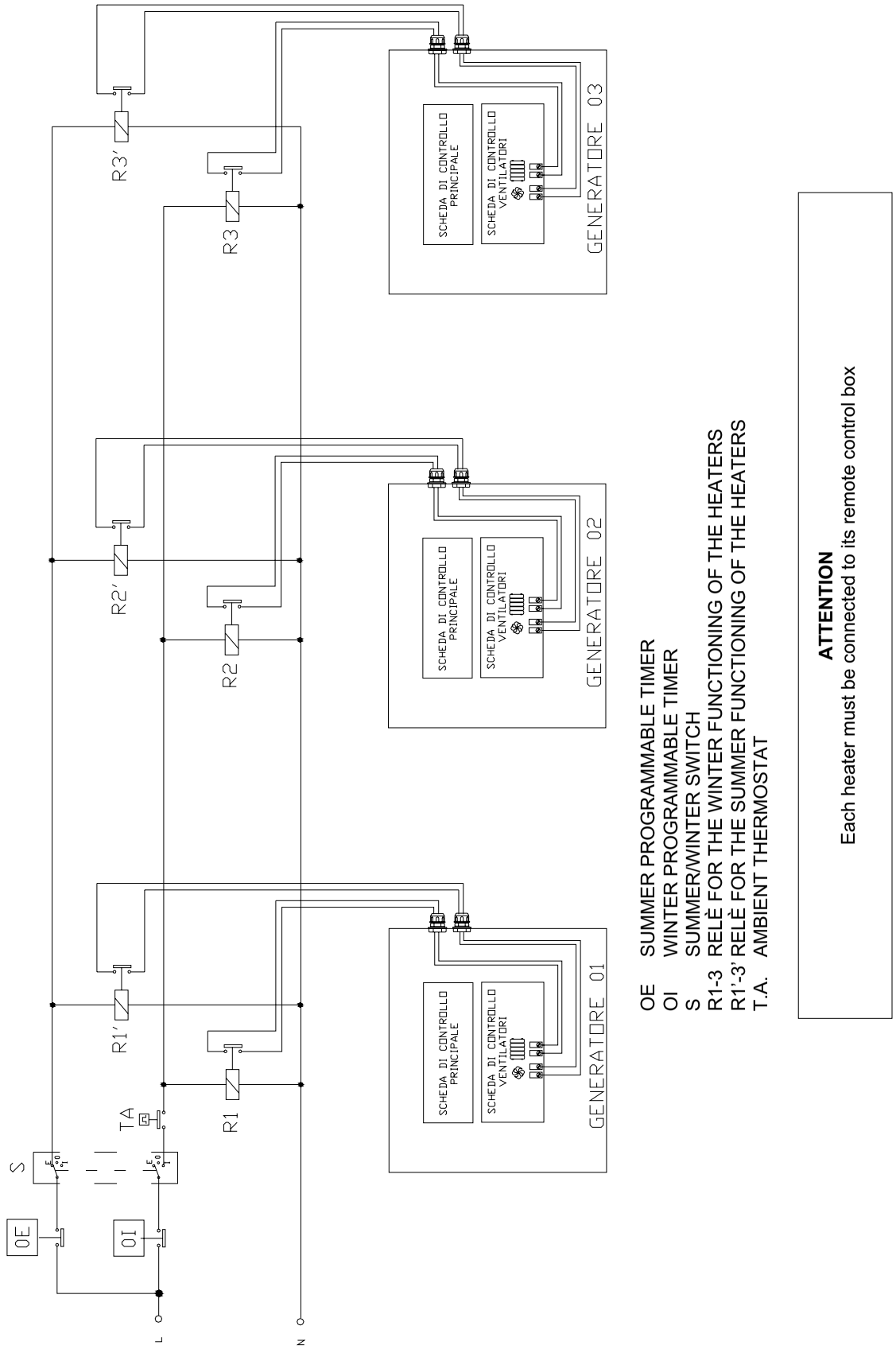


Figure 24 – Wiring diagram for multiple heaters installation with one programmer and one room thermostat

SECTION 5: MAINTENANCE AND SERVICING

In this section you can find a few maintenance suggestions and the instructions which are necessary to technical assistants in order to adjust the gas valve and replace the gas.

5.1 HOW TO ADJUST THE GAS VALVE

For a correct operation of the F2 Series gas fired unit heaters it is necessary that the calibration values of the gas valve are equal to those indicated in the table here below. The appliance is sent from the factory with the gas valve already calibrated. If you need to adjust the gas valve, proceed as described here below.

OFF-SET VALUES		
		F2 80
RATED OFF-SET	**(mbar)** **(mmH_2O)**	-0,15 -1,5
MAXIMUM OFF-SET	**(mbar)** **(mmH_2O)**	-0,09 -0,9
MINIMUM OFF-SET	**(mbar)** **(mmH_2O)**	-0,25 -2,5

Table 8 – OFF-SET values

To Have: the heater installed and connected to the power and gas supply lines.

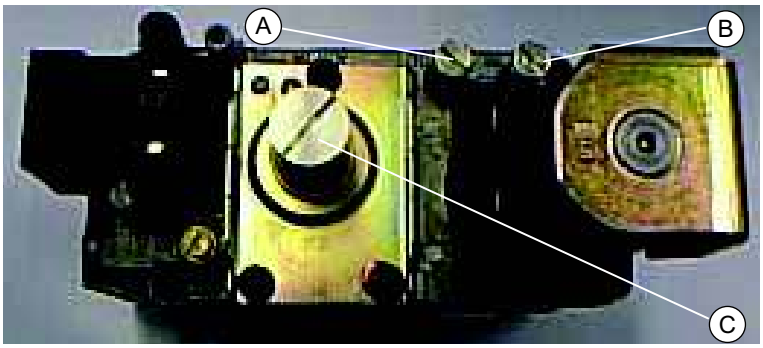
The gas valve adjustment must be performed by **qualified personnel**. To this regard, ROBUR S.p.A. can dispose of a network of Assistance Centres which can be reached through the point of sale, the local agent or by calling directly the Customer Assistance of ROBUR S.p.A. (tel. +39 035/888111).

1 - Connect a pressure gauge to the pressure connector A, after removing the relevant fastening screw (see Figure 25 at page 40).

In case of use of a differential pressure gauge, you need to connect the pressure connector A of the gas valve to the pressure gauge connector + (positive).

2 - Turn on the appliance and wait until the flame is stabilized (2 minutes approximately).

3 - With door open, operate on the off-set adjusting screw C (see Figure 25 at page 40) until the rated value specified in Table 8 is obtained.



A PRESSURE CONNECTOR FOR OFF-SET ADJUSTMENT
B GAS SUPPLY PRESSURE CONNECTOR
C OFF SET CONNECTOR

Figure 25 – Sit 822 Novamix VALVE

4 - Verify that the CO_2 percentage matches the value indicated in Table 4 at page 20. Otherwise, readjust the off-set, which in any case MUST never be higher than the maximum off-set value (see Table 8) or lower than the minimum off-set value (see Table 8), until the CO_2 percentage is equal to the value specified in Table 4 at page 20.

5 - Disconnect the pressure gauge and retighten the fastening screw of the pressure connector A.

6 - Turn the heater off and switch it on twice or three times to check that the calibration is stable.

5.2 HOW TO REPLACE THE GAS

To Have: the heater installed and connected to the power and gas supply lines.

The gas replacement operation must be performed by **qualified personnel**. A wrong, incorrect or imprudent installation of the gas circuit can cause very dangerous gas leaks on all the circuit and in particular in the tampered areas. Moreover, use suitable sealants on all fittings.

If the type of gas indicated on the label does not match that to be used, the appliance must be converted and adapted to the desired type of gas.
For this operation proceed as follows:

1 - Cut off the power and gas supply lines.

2 - Unscrew the four fastening screws of the gas flange (see Figure 26).

3 - Extract the gas flange/pipe assembly (see Figure 27).

4 - Remove the seal by paying attention not to damage or loose it (see Figure 28).

5 - Replace the nozzle (see Figure 29) and replace the seal.

6 - Secure the gas flange/pipe assembly by the four fastening screws.

7 - Modify the position of the mini dip No. 5, placed on the electronic control board: ON if the appliance runs on GPL, OFF if the appliance works on natural gas (Figure 30).

8 - Check that the OFF-SET value matches that indicated in Table 8 at page 39. Otherwise, adjust it as described in Paragraph 5.1 HOW TO ADJUST THE GAS VALVE at page 39.

9 - Replace the label applied to the heater showing the type of gas for which the unit is set with the other one indicating the type of gas actually used.

NATURAL GAS AND L.P.G. NOZZLES		
		F2 80
Natural Gas (G20)	**diameter (mm)** **printed code**	10,30 168
LPG (G30-G31)	**diameter (mm)** **printed code**	7,90 152

Table 9 – F2 Series Nozzle Data (Diameters and Codes)

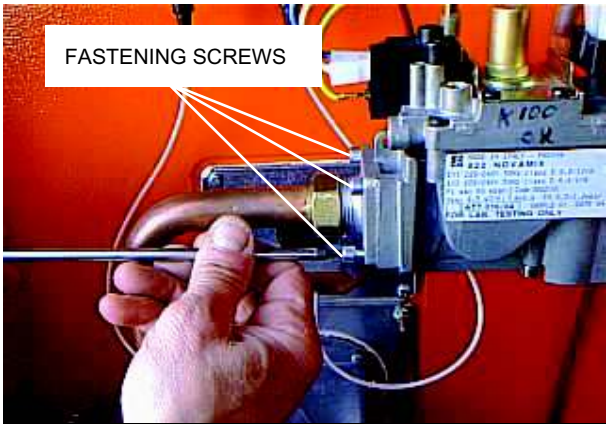


Figure 26 – Gas flange fastening screws

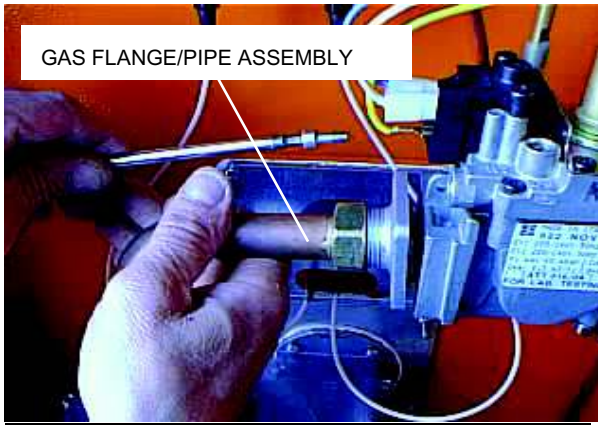


Figure 27 – Gas flange/pipe assembly

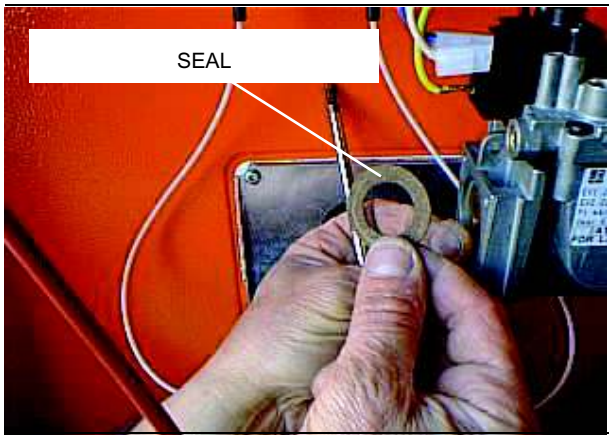


Figure 28 – Seal

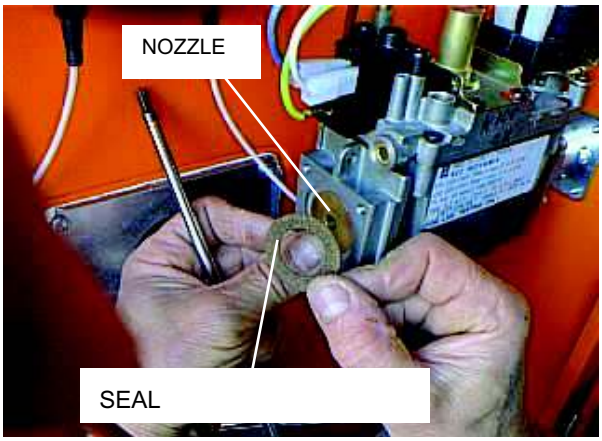
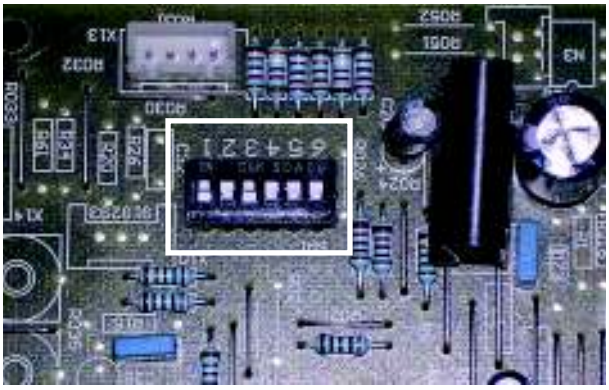
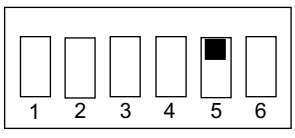


Figure 29 – Nozzle replacement





ON: for LPG operation
OFF: for NATURAL GAS operation

Figure 30 – Board mini dip position

5.3 MAINTENANCE

An accurate maintenance is always source of saving and safety.
Maintenance for heating units must be done, preferably at the beginning of winter, **by qualified service engineers**.

To ensure a correct and continuous operation it is recommended to carry out, at least once a year, a general cleaning of the appliance (by paying particular attention to clean heat exchangers and fan grids) e the combustion tests in conformity with specific regulations on the matter.

5.4 FAULT LOCATION

Any faults which may occur during the normal working of the heater can be identified by the appropriate warning light (C) located on the key (B) of the remote control box (see Figure 2 of page 13). The Table below provides the descriptions of the faults identified by the remote control box and the corresponding signalling modes.

FAULT	LED SIGNAL
FLAME LOCKOUT	STEADY
LIMIT THERMOSTAT OPERATION	FLASHING (ON = 4 SECONDS, OFF = 1 SECOND) (1)
OTHERS	BLINKING (ON = 1 SECOND, OFF = 4 SECONDS) (1)

Table 10 – Faults Identified by the Remote Control Box

(1) AFTER 72 HOURS OF CONTINUOUS FLASHING MODE, THE SIGNALLING MODE BECOMES STEADY.

5.5 FAULTS AND SOLUTIONS

Before performing particular tests, make sure that:

A) The power supply is connected: 230 V ± 10% 50 Hz and the appliance is properly grounded.

B) The gas supply is connected.

C) Pressures and flow rates are within the predefined limits. An insufficient gas supply corresponds to a pressure value lower than that indicated by the Manufacturer. The causes can be:

If the appliance runs on Natural Gas:

- a) Insufficient counter.
- b) Length and/or number of gas pipe elbows excessive compared to the diameter used.

If the appliance runs on L.P.G.:

- a) It may happen that, after the burner turns off for the first time, at the switching on of the appliance this last locks out. In this case it is possible that the pressure reducer flow is not enough.
- b) If the specified pressure is not reached, it is possible that the pressure reducer installed on the tank has an insufficient flow rate, or that the length and/or number of gas pipe elbows is excessive compared to the diameter used. Solo a questo punto procedere al controllo del guasto in particolare (vedi Table 11).

Before opening the side door to reach the electric switchboard CUT OFF THE POWER to the appliance by the 2-pole switch located upstream the appliance.

LED SIGNAL	FAULT DESCRIPTION	CAUSES	ACTIONS REQUIRED
Steady	Flame lockout due to the failed burner ignition	• The ignition electrodes are broken or badly positioned • The sensing electrode is broken or badly positioned or touches the metal casing of the appliance. • Electronic control board or its electrical connections damaged • Gas valve or its electrical connections damaged • Bad grounding system • Presence of air in the gas pipe or failed gas delivery • Incorrect gas valve calibration	• Reposition or replace electrodes • Reposition or replace the electrode • Replace the board • Replace the gas valve • Improve the grounding system • Purge the air in the gas pipe • Gas valve adjustment After identifying and eliminating the fault cause press the reset key B on the remote control box. **WARNING:** after four resets within 1 hour, the error can not be reset manually. In order to reset the error, you must wait one hour or do a power reset (cut OFF the electrical supply and than switch it ON)
Flashing (on: 4 sec. off: 1 sec.)	Limit thermostat operation due to the overheating of the heat exchangers	• Deposit of dirt on the air intake opening • Obstruction of the exhaust opening • Fan failure • Sudden power cut-off to the heater in operation	After identifying and eliminating the fault cause press the reset key B on the remote control box. **WARNING:** after four resets within 1 hour, the error can not be reset manually. In order to reset the error, you must wait one hour or do a power reset (cut OFF the electrical supply and than switch it ON)
Flashing (on: 1 sec. off: 4 sec.)	Exchanger temperature sensor damaged	• Supply air temperature sensor damaged	The fault signal is automatically cleared when the fault cause is eliminated.
Flashing (on: 1 sec. off: 4 sec.)	Air pressure switch consensus failed	• Air pressure switch connection or tube damaged or clogged • Excessive resistance (length) of the air intake/flue exhaust piping system. • Air intake or flue exhaust pipe clogged • Air pressure switch out of calibration or dirty	The fault signal is automatically cleared when the fault cause is eliminated.
Flashing (on: 1 sec. off: 4 sec.)	Blower operation failed	• Loose electrical connections • Blower engine failure • Degradation of running performances	The fault signal is automatically cleared when the fault cause is eliminated.
Fault NOT detected by the remote control	The burner turns off and does not restart independently from the room temperature	• The position of the room thermostat is influenced by the presence of heat sources or is hit by the hot air flow	• Change the position of the room thermostat

Table 11 – Malfunctions

Revision: C Code:D-LBR552 11MCMSDC015 06/06/2011

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